

# A NEW SPECIES OF GARNOTIA (POACEAE) FROM KERALA, INDIA

C.N. Sunil, V.V. Naveen Kumar, and M.G. Sanilkumar

Post Graduate and Research Department of Botany  
SNM College, Maliankara  
Ernakulam District, Kerala, INDIA  
dr.cnsunil@yahoo.in

## ABSTRACT

**Garnotia variyamensis** Sunil, Naveen Kumar, & Sanilkumar, a new species of *Garnotia* from Ernakulam District of Kerala, India, is described and illustrated. The species is distinguishable by the presence of dissimilar spikelet pairs, with one sessile or nearly so with an unawned lemma with empty or male flowers, the other pedicelled with a shortly bifid lemma with a geniculate awn in the sinus and bisexual flowers. The species is also notable by the awned glumes and broad axes of the panicle and its branches. The novelty is probably allied to *Garnotia courtallensis*.

KEY WORDS: Poaceae, Garnotieae, *Garnotia variyamensis*, new species, India, Kerala, Ernakulam District

## RESUMEN

**Garnotia variyamensis** Sunil, Naveen Kumar, & Sanilkumar, es una nueva especie de *Garnotia* de Ernakulam Distrito de Kerala, India, que se describe y se ilustra. La especie se distingue por la presencia de pares de espiguillas disimilares, una sétil o casi con un lema mítico con flores vacías o masculinas, la otra pedicelada con un lema cortamente bifido con una arista geniculada en el seno y flores bisexuales. La especie es también notable por sus glumas míticas y ejes de la panícula y sus ramas anchos. La novedad está relacionada con *Garnotia courtallensis*.

## INTRODUCTION

The genus *Garnotia* Brongn. (Subfamily-Panicoideae, Tribe-Garnotteae) is represented by ca. 39 species distributed in Asiatic and Pacific regions of the world (Mabberley 2008). Gould (1972) while revising *Garnotia*, recognized 29 species and six varieties and categorised them under two sections, sect. *Garnotia* and sect. *Scoparia*. In India, *Garnotia* is represented by about 12 species (Prakash & Jain 1979) and most of them are distributed in Peninsular India. In Kerala, this genus has so far been represented by 10 species (Nayar et al. 2006). The present new taxon from Kerala state is an additional species to the known species of the genus.

During floristic exploration in Ernakulam district of Kerala, India, the authors came across an interesting *Garnotia* from a moist rocky area of Variyam in Edamalayar Forest range. A critical examination revealed that the specimen was distinct from the hitherto known species of the genus. It is described and illustrated here as a new species.

**Garnotia variyamensis** Sunil, Naveen Kumar, & Sanilkumar, sp. nov. (Figs. 1, 2). TYPE: INDIA. KERALA: Ernakulam District, Edamalayar Forest Range, Variyam, 10°12.595'N & 76°52.441'E, elev. ca. 794 m, 16 Oct 2013, Sunil & Naveen Kumar 6193 (HOLOTYPE: CAL; ISOTYPE: MH).

Differs from all *G. courtallensis* in its lower glume shorter than the upper glume and lemma with geniculate, twisted awn, but differs by the large leaves, dissimilar spikelet pairs, awned glumes, and long-awned lemma of pedicelled spikelets.

Annual herbs. Culms 15–105 cm long, erect or geniculate, generally purplish; nodes villous, lower ones rooting. Leaf sheaths upto 8 cm long, slightly keeled, striate, tuberculate hairy, margins ciliate; ligules ca. 0.5 mm long, membranous; blades 4–15 × 0.8–2 cm, ovate-lanceolate or broadly lanceolate, base rounded to shallowly cordate, margins scabrid towards apex, apex acuminate, softly pubescent, articulated to sheath, membranous, lower side generally purplish, upper side greenish, collar hairy. Panicles 9–30 cm long, narrowly contracted; branches 2–4 per node in distant fascicles, 1.8–4 cm long, appressed to main axis, erect; rachis triquetrous to flattened, 1–1.3 mm broad, convex on back, scabrid on outer margins. Spikelets paired, dissimilar, one sessile and the other pedicelled, 3–3.3 × 0.5–0.6 mm, lanceolate, acuminate at apex, 1-flowered; callus shortly bearded

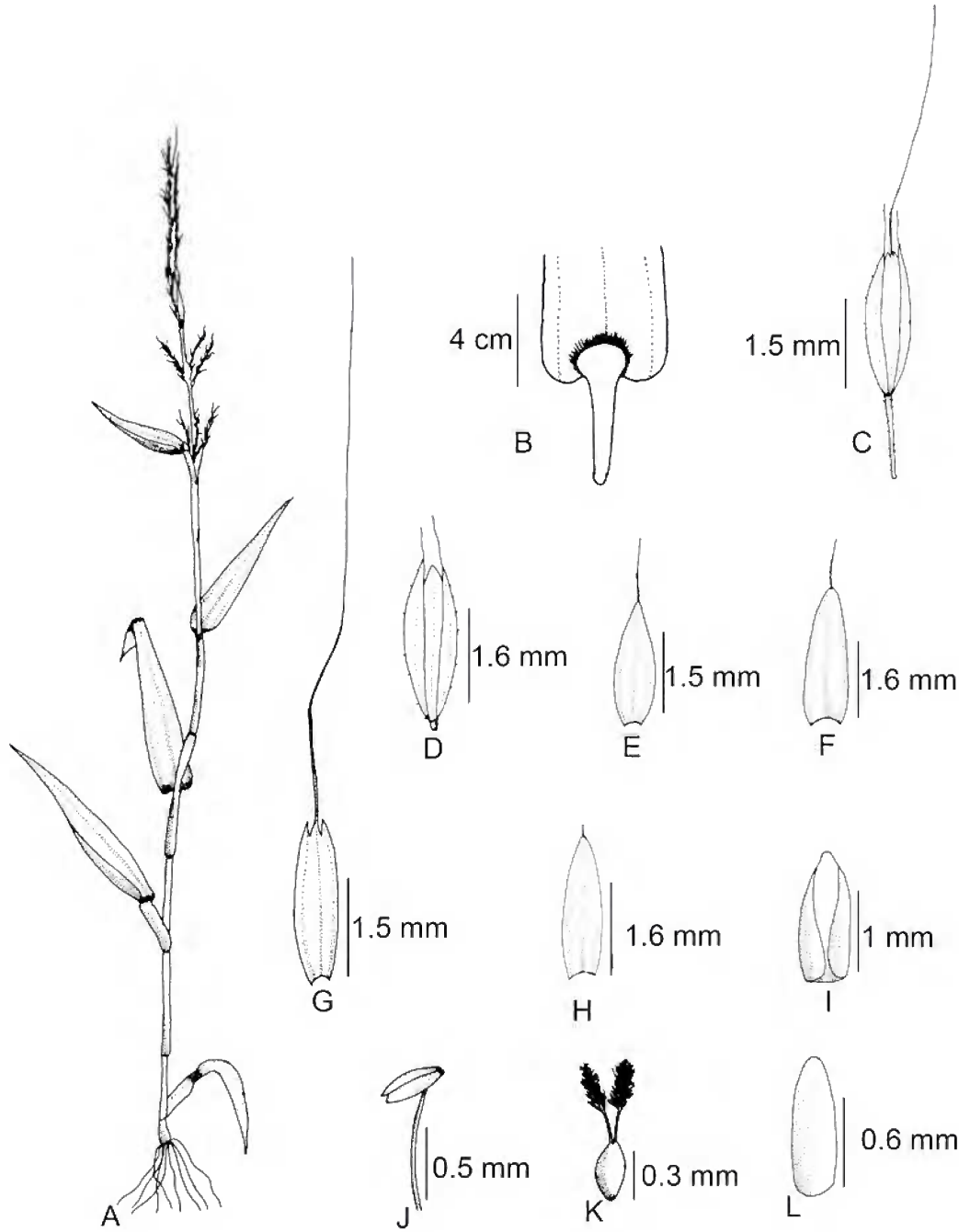


FIG. 1. *Garnotia variyamensis*. A. Habit; B. Base of Leaf; C. Single pedicelled spikelet; D. Sessile spikelet; E. Lower Glume; F. Upper Glume; G. Lemma of pedicelled spikelet; H. Lemma of sessile spikelet; I. Palea; J. Stamen; K. Pistil; L. Caryopsis. Based on Sunil & Naveen Kumar 6193 (CAL).

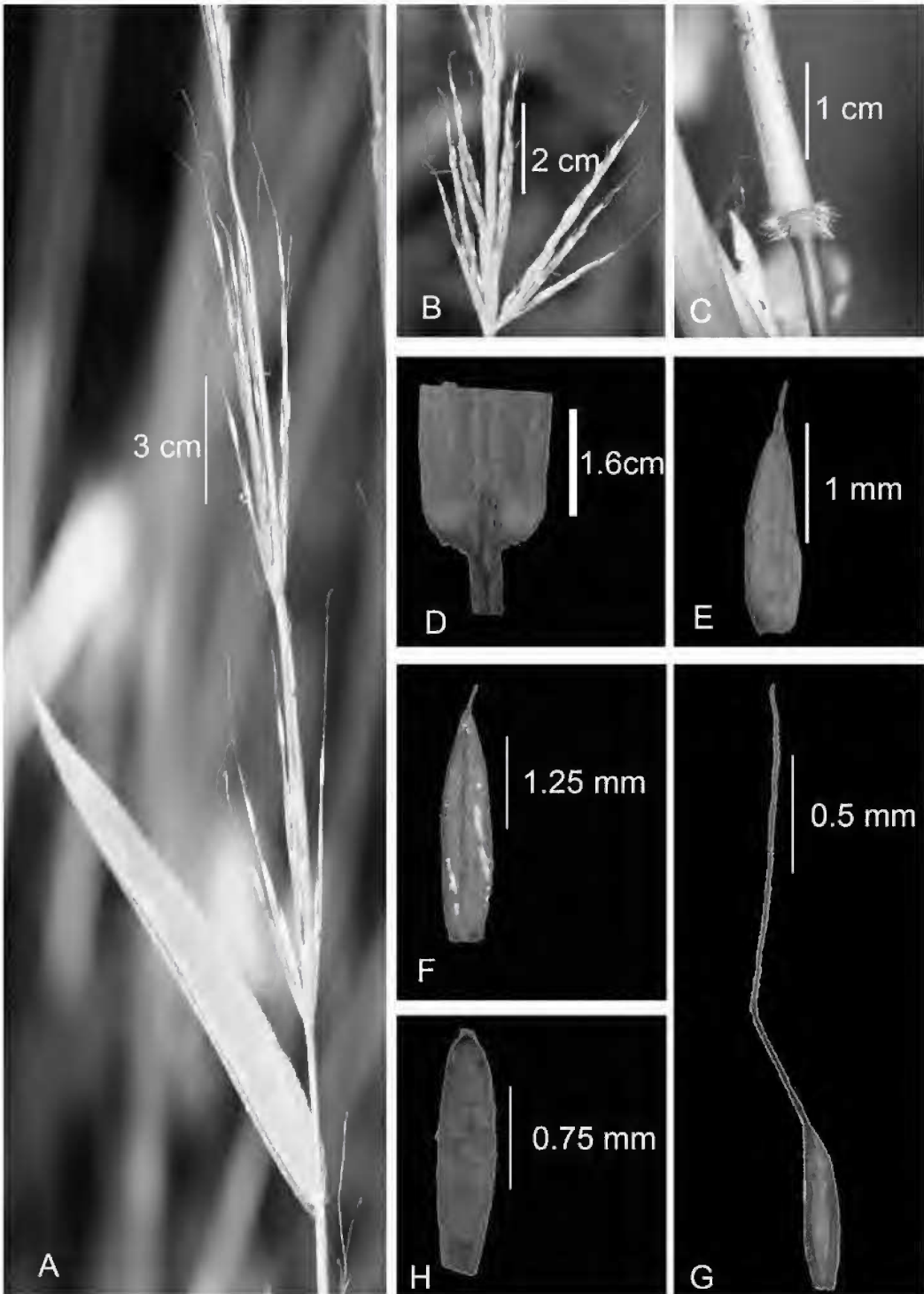


FIG. 2. *Garnotia variyamensis*. A. Habit; B. Inflorescence node showing racemes; C. Villous nodes; D. Leaf base; E. Lower glume; F. Upper glume; G. Lemma of pedicelled spikelet; H. Palea. Photos by C.N. Sunil (type collection: Sunil & Naveen Kumar 6193 (CAL)).

or glabrous; pedicels 2–3 mm long, triquetrous, scabrid on margins. Sessile spikelets empty or male or rarely with rudimentary pistil, usually awnless; pedicelled spikelets bisexual, awned. Lower glume 2.6–2.9 × 0.5–0.6 mm, lanceolate, pale green, chartaceous, 3-nerved, lateral nerves scabrid, awned; awn upto 2.5 mm long, scabrid. Upper glume 3–3.2 × 0.5–0.6 mm, lanceolate, chartaceous, 3-nerved, lateral nerves scabrid, awned; awn upto 2 mm long, scabrid. Lemma 2.7–3 × 0.5–0.6 mm, lanceolate, margins in-rolled, acuminate and unawned or shortly aristate in sessile spikelets and shortly 2-lobed, awned from sinus in pedicelled spikelets, subcoriaceous, hyaline, 3-nerved; awns 11–14 mm long, geniculate, scabrid, column 2–2.5 mm long, dark brownish, twisted. Palea 2–2.2 × 0.4–0.5 mm, lanceolate, acute at apex, 2-nerved 2-keeled, hyaline. Stamens 3; anthers 0.5–0.7 mm long, oblong, cream-yellow. Ovary ca. 0.3 mm long, ellipsoid; style ca. 0.5 mm long, slender; stigma 0.5–0.7 mm long, purple, feathery. Lodicules 2, ca. 0.2 mm long, obovate, truncate. Caryopsis 1–1.2 × ca. 0.5 mm, oblong, pale brownish.

*Flowering & Fruiting*.—August–November.

*Etymology*.—The species is named after its type locality, Variyam, a tribal settlement within the Western Ghats.

*Habitat and Ecology*.—*Garnotia variyamensis* grows on wet exposed rocky grassland among mosses in association with *Tripogon sivarajanii* Sunil, *T. wightii* Hook.f., *Dimeria* spp., *Exacum sessile* L., *Impatiens viscosa* Bedd., and *Arundina graminifolia* (D. Don) Hochr.

*Taxonomic note*.—*Garnotia variyamensis* resembles *Garnotia courtallensis* Thwaites in its lower glume shorter than the upper glume and lemma with geniculate, twisted awn, but differs by the large leaves, dissimilar spikelet pairs, awned glumes, and long-awned lemma of pedicelled spikelets. Diagnostic morphological characters of *Garnotia variyamensis* and *Garnotia courtallensis* are provided in Table 1 and in the following key.

#### KEY TO SECTIONS OF GARNOTIA IN INDIA

1. Leaf blade and leaf sheath junction distinct, articulated; leaf sheath margins glabrous to ciliate but not woolly \_\_\_\_\_ Sect. 1. **Garnotia**
1. Leaf blade and leaf sheath junction indistinct, not articulated; leaf sheath margins woolly near base \_\_\_\_\_ Sect. 2. **Scoparia**
- Sect. 1. **Garnotia**
1. Lemma with straight awn.
  2. Some spikelets awned, others awnless; spikelets upto 3 mm long \_\_\_\_\_ **G. micrantha** var. **micrantha**
  2. All spikelets awned; spikelets 3–5 mm long.
    3. Leaf-blades with a row of long hairs immediately behind the ligule \_\_\_\_\_ **G. fergusonii**
    3. Leaf-blades without a row of long hairs behind the ligule \_\_\_\_\_ **G. acutigluma**
1. Lemma with geniculate awn.
  4. Awn of lemma 16–26 mm long.
    5. Plants 5–25 cm long, usually growing with moss on tree trunks and rocks; lemma apex bifid, but the lobes not setaceous; panicle lax, few flowered, spreading \_\_\_\_\_ **G. arborum**
    5. Plants 20–50 cm long, not growing in moss on trees and rocks; lemma apex with narrow setaceous lobes; panicle contracted, many flowered \_\_\_\_\_ **G. polypogonoides**
  4. Awn of lemma 5–14 mm long.
    6. Awn of lemma without well- marked twisted column; apex of leaf-blades ending in a filiform tip \_\_\_\_\_ **G. arundinacea**
    6. Awn of lemma with well- marked twisted dark column; apex of leaf blades without filiform tips.
      7. Lower glume longer than the upper one or subequal.
        8. Awns geniculate at or near the base; leaf blades with a dense row of hairs immediately behind the ligule; collar densely hairy \_\_\_\_\_ **G. fergusonii**
        8. Awns geniculate well above the base; leaf-blades without a dense row of hairs behind the ligule; collar glabrous \_\_\_\_\_ **G. tenella**
      7. Lower glume shorter than the upper one.
        9. Leaf-blades 1–2 cm broad; spikelets dissimilar, one sessile and the other pedicelled, sessile spikelets male or empty, its lemma awnless; glumes awned; awns on lemma 11–14 mm long \_\_\_\_\_ **G. variyamensis**
        9. Leaf-blades 0.3–1 cm broad; spikelets similar, in unequally pedicelled pairs, all bisexual, its lemma awned; glumes awnless; awns on lemma 3–7 mm long \_\_\_\_\_ **G. courtallensis**

#### SECTION 2. SCOPARIA

1. Spikelets awnless; leaf-blades oblanceolate, flat \_\_\_\_\_ **G. exaristata**
1. Spikelets awned; leaf-blades linear, canalculated, triangular in section.
  2. Awn geniculate at or near the base without well- marked twisted column \_\_\_\_\_ **G. scoparia**
  2. Awn geniculate well above the base with a well- marked twisted column.

TABLE 1. Diagnostic morphological characters of *Garnotia varyiamensis* and *Garnotia courtallensis*.

Character	<i>Garnotia varyiamensis</i>	<i>Garnotia courtallensis</i>
Culm	15–105 cm high.	10–60 cm high.
Leaf blades	4–15 cm long, 0.8–2 cm broad.	2–9 cm long, 0.2–1 cm broad.
Panicles	9–30 cm long, axis and branches very broad, triquetrous to flattened, convex on back.	4–15 cm long, axis and branches narrow and slender.
Panicle branches	Erect, more or less appressed to main axis.	Widely spreading or compacted.
Spikelets	Paired, dissimilar, one sessile and the other pedicelled, sessile spikelets empty or male, its lemma unawned	In unequally pedicelled pairs, similar, all bisexual and awned or lower ones of panicle unawned.
Glumes	With up to 2.5 mm long awn.	Acute, unawned.
Lemma	Of pedicelled spikelets shortly 2-lobed at apex and awned from sinus and that of sessile spikelet acuminate and unawned.	Entire or sometimes two lobed, acute, and awned from apex or rarely lower ones of panicle unawned.
Lemma awn	11–14 mm long.	3–7 mm long.

3. Spikelets 5–7.5 mm long; panicle 9–25 cm long, congested; awn of lemma 5–12 mm long \_\_\_\_\_ **G. schmidii**  
3. Spikelets 3–5.5 mm long; panicle 28–60 cm long, not congested; awn of lemma 3.5–5 mm long \_\_\_\_\_ **G. elata**

*Conservation status.*—The distribution of *Garnotia varyiamensis* showed that there were less than 245 mature individuals restricted to an area of 5km<sup>2</sup>. By following IUCN criteria for assessing the status of rare and threatened plants (IUCN, 2001), *Garnotia varyiamensis* is belonging to critically endangered (CR) category.

ACKNOWLEDGMENTS

The authors are grateful to the University Grants Commission, New Delhi, for financial assistance for the study. We express our thanks to the Kerala Forest Department for permitting collection of specimens. Sincere thanks are expressed to the manager, SNM College, Maliankara, for providing the facilities. Help rendered by K.D. Girija and other members of the Department of Botany, SNM College, Maliankara, are also thankfully acknowledged. We greatly appreciate careful reviews by Alok Chorghé, Jeffery Saarela, and an anonymous reviewer.

REFERENCES

BOR, N.L. 1960. The grasses of Burma, Ceylon, India and Pakistan (excluding Bambuseae). Pergamon Press, London, Oxford, New York, Paris.  
GOULD, F.W. 1972. A systematic treatment of *Garnotia* (Gramineae). Kew Bull. 27(3):515–562  
IUCN. 2001. IUCN Red list categories and criteria (version 3.1). IUCN, Gland, Switzerland and Cambridge, U.K.  
MABBERLEY, D.J. 2008. Mabberley's plant-book: A portable dictionary of plants, their classification and uses. Third Edition. Cambridge University Press, Cambridge, U.K.  
NAYAR, T.S., A. RASIYABEEM, N. MOHANAN, & G. RAJUMAR. 2006. Flowering plants of Kerala. Tropical Botanical Garden and Research Institute, Palode, Thiruvananthapuram, India.  
PRAKASH, V. & S.K. JAIN. 1979. Poaceae: Garnotieae. In: Fasc. Fl. India 3:1–16, Botanical Survey of India, Calcutta, India.